LAW OFFICES
DENNISON, SCHULTZ & DOUGHERTY
612 CRYSTAL SQUARE 4
1745 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VIRGINIA 22202-3417
703 412-1155

REMARKS

The Office action of February 27, 2003, has been carefully considered.

Claims 1, 2, 8 through 11 and 41 have been rejected under 35 USC 102(b) as anticipated by the patent to Breton.

Claim 1 has now been amended to incorporate the recitations of Claim 19 relating to the resistivity of the composite material forming the sheath, and Claim 19 has been amended to depend from Claim 4. It is noted that new Claims 44 and 45, now added to the application, also recite the resistivity of the composite material.

Withdrawal of this rejection is accordingly requested.

Claims 3 through 7, 12 through 29, 37 through 40 and 42-43 have been rejected under 35 USC 103 over Breton in view of Marcus et al. This rejection will be treated as incorporating all claims now in the application.

Breton discloses a plasma generator in which the dielectric sheath is made of a material of high resistivity, at least 10^{15} Ω m. See column 4, lines 24-25.

As noted on page 6 of the present application, the use of the claimed composite material with lower resistivity

provides an improvement concerning the emission of electrons and the production of ions that are actually obtained, and also avoids the need to make a proximal conical structure adjacent the emitter end of each needle. The apparatus is thus easier to manufacture and the zero potential lines drop down along the sheath without any need for conical structure.

The Marcus et al reference discloses a method for manufacturing microminiature tapered all-metal structures having tips of a very small size, as disclosed at column 5, lines 54 through 59. These tips typically have a height of 1 to 10 microns and are spaced 2 to 20 microns apart.

Marcus et al has been cited to show that these tips may be formed from titanium with a deposited layer of gold. However, Marcus et al does not suggest using such needles in an apparatus for generating ions. Moreover, the combination of a composite material as claimed and needles made of platinum or titanium or a mixture thereof is particularly advantageous, as disclosed in the specification at page 12, line 33 through page 13, line 10, since it makes it possible to achieve an optimum electric field for a given power supply voltage. This particular combination reinforces the flux of emitted electrons and the efficiency of ion production is improved, the flux is obtained as emitted in a manner that is

LAW OFFICES
DENNISON, SCHULTZ & DOUGHERTY
612 CRYSTAL SQUARE 4
1745 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VIRGINIA 22202-3417
703 412-1155

long lasting and stable, and the production of peroxide type compounds and other toxic compounds is reduced, together with lateral corona effects.

Since the Marcus et al reference does not disclose the use of such needles in ion generating devices, there is certainly no expectation that these advantages would result from using the needles in such devices.

Withdrawal of this rejection is requested.

New Claims 44 and 45 have been added to the application, both of these claims reciting that the sheath is of a cylindrical outside shape without conical structure. Since it would be expected that a conical sheath would be required, Applicant submits that these claims are patentable over the art.

In view of the foregoing amendments and remarks, Applicant submits that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,

Ira J. Schultz
Registration No. 28666

LAW OFFICES
DENNISON, SCHULTZ & DOUGHERTY
612 CRYSTAL SQUARE 4
1745 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VIRGINIA 22202-3417
703 412-1155